

Chico

**Golden  
Empire  
Amateur  
Radio  
Society, Inc.**

www.gearsw6rhc.org

"Dedicated to Public Service"

# THE RADIATOR

W6RHC  
IRLP #8170

P.O. Box 202 Chico, CA 95927

January 2023 Newsletter

GEARS Founded August 13, 1939

From the President

Happy New Year and welcome to 2023. I'm proud to be serving as the President of GEARS.

I'm back in Chico returning from travels to Nevada and Southern California visiting family and friends for the holidays. My brother Will's family joined me at our dad's house to exchange gifts and share Christmas dinner after Will's return from Shanghai where he works on theme park lighting design for Disney. My nephew Ben was most excited about the model train cars he got under the tree and almost as excited playing with my HT and listening to radio traffic.

Michelle, Will's wife, expressed gratitude for showing them my Jackery battery/inverter a few years ago, hooked up to a solar panel and ham radio gear. After learning about the battery product category, they found the unit they purchased to be useful during power outages and have since graduated to a larger EcoFlow Delta system. This year I showed them "my precious" Bluetti EB3A and its wireless cellphone charging feature, which worked with Will's iPhone.



The next ham radio breakfast will 9am on the second Saturday, January 14<sup>th</sup> at Farmer's Skillet on Cohasset in Chico.

Our next general meeting is on January 23<sup>th</sup> at the Chico Public Library, 1108 Sherman Ave. Normally our meetings are on the third Monday, however due to a scheduling conflict it will be on the 23<sup>rd</sup>. At the meeting we are discussing mobile radio installations. 6 pm social gathering, 7 pm meeting. I had my mobile scanning the usual ham repeater pairs and 146.52 during my long drives on the Interstate.

Check in to the weekly GEARS net at 7:30 pm on 146.85- pl 110.

'73

J. Kent Hastings WA6ZFY  
[wa6zfy@arrl.net](mailto:wa6zfy@arrl.net)

## January 2023 Calendar

Sun	Mon	Tue	Wed	Thu	Fri	Sat
1	2 7pm GARS Net 8pm ARES Net <b>7pm GEARS Board Meeting</b>	3 7pm PARS Net 7:30pm GEARS Net	4	5 7:30pm Simplex Net	6	7
8 8pm OARS Net	9 7pm GARS Net 8pm ARES Net	10 7pm PARS Net 7:30pm GEARS Net	11	12 6:30 pm PARS meetings 7:30pm Simplex Net	13 7pm OARS meeting 7pm GARS meeting	14 <b>9am Chico Breakfast</b>
15 8pm OARS Net	16 7pm GARS Net 8pm ARES Net	17 7pm PARS Net 7:30pm GEARS Net	18	19 7:30pm Simplex Net	20	21
22 8pm OARS Net	23 <b>6pm GEARS Meeting</b> 7pm GARS Net 8pm ARES Net	24 7pm PARS Net 7:30pm GEARS Net	25	26 7:30 Simplex Net	27	28 9am OARS Breakfast
29	30 7pm GARS Net 8pm ARES Net	31 7:30pm GEARS Net				

**VEC Testing**, FCC License Exam available by appointment. For information or registration call Tom Rider, W6JS 530-514-9211

**Chico Breakfast** 2nd Saturday 9am Farmers Skillet Cohasset Rd, Chico

**GEARS Board Meeting** 1st Monday 7pm by Google video meetups.

**PARS Meeting** 2nd Thursday 6:30pm, doors open 6pm Old Magalia Community Resource Center

**OARS Meeting** Second Friday of the month, St. Pauls Episcopal Church Hall, Oroville.

**GARS Meeting** Second Friday of the month, Lutheran Church Hall, Artois.

**GEARS Meeting**, Doors open 6pm, meeting 7pm at Chico Public Library, 1108 Sherman Ave, Chico

**OARS Breakfast** 4th Saturday of the month, at Cornucopia of Oroville.

### NETS:

OARS Club Net Sunday 8pm 146.655 Mhz - PL 136.5

GARS Club Net Monday, 7:00 pm 147.105 MHz + PL 110.09, secondary: 146.850 MHz-PL 110.9

Yuba Sutter Club Net Monday 7pm 146.085 MHz + PL 127.3

GEARS Club Net Tuesdays 7:30 PM 146.850 MHz - PL 110.9

PARS Club Net Tuesday 7pm 145.290 - PL 110.9

Simplex Net Thursday 7:30 p.m. 146.52 no tone

Yuba Sutter ARES Net Thursdays 7pm 146.085 MHz + PL 127.3

Sacramento Valley Traffic Net Nightly 9:00 PM 146.850 MHz - PL 110.9

## 75 Years of the Transistor

From Marketplace.org

The future began 75 years ago with the invention of something small that's considered the most manufactured item in human history. Odds are, you are surrounded by them right now.

The transistor was born in December of 1947, in New Jersey, and it has defined the last half of the 20th century and the first quarter of the 21st. We're exploring the cultures of innovation that brought us the device that changed everything.

Take a look around the room. You'd be hard-pressed to find a gadget or gizmo within reach that does not contain a transistor. Just about everything electronic is full of them. Modern amateur radio depends on them.

Our information and communications world owes a debt to a team of physicists who took theories that had been kicking around for decades, and — after years of false starts and dead ends — got the first transistor to work early in the postwar era.

This transistor was a contrivance that used a shard of rock: germanium, an element that's not an electrical conductor like copper, nor is it an insulator like rubber. It's something in between — a semiconductor.

Brattain and Bardeen's supervisor, William Shockley, was so mad he hadn't figured it out himself that in a convulsion of creativity just a month later, Shockley thought up an improved, easier-to-manufacture version of the transistor. All three would win the Nobel Prize for these innovations.

"It has enabled this global civilization," said Michael Riordan, a physicist and science historian. He's co-author with Lillian Hoddeson of "Crystal Fire: The Invention of the Transistor and the Birth of the Information Age," widely regarded as the definitive history of the transistor.

"I would put it on the [same] level as fire, in terms of its importance to what modern life is like today," Riordan said.

There's almost a magic to the transistor. There are no moving parts. If you don't have germanium, you can make it from sand, silicon. It continues to be manufactured smaller and smaller yet still works. It doesn't use much power. Yet it's responsible for so much. They could replace the bulky, fragile glass tubes that heated up the insides of earlier electronics. That was the challenge.

What followed was ... pretty much everything: a radio about the size of a deck of cards. Satellites. Computers everywhere. Movies on your mobile phone. E-commerce. The collapse of newspapers. Social media addiction.

In the second half of the last century, transistors took over and replaced all the functions of the tubes in our ham radios -- except for the final amplifiers in our transmitters. Eventually, transistors even took over the final amplifier function. Then came the IC, which did to the transistor what the transistor did to the tube.

For more, see the online transistor museum: [http://semiconductormuseum.com/Museum\\_Index.htm](http://semiconductormuseum.com/Museum_Index.htm)



*The first transistor, developed by Walter Brattain and John Bardeen of Bell Telephone, consisted of the semiconductor germanium, gold, a crude spring and a metal base.*

## Some Ham Radio Resolutions

It's 2023, time to make some ham radio New Year's resolutions. Here are a few suggestions.

I resolve to...

Make my first DX QSO

Do everything I can to be the best possible operator I can be

Be a courteous and welcoming operator at all times, especially to those who are new to the ham radio community

Expand my knowledge of amateur radio and share it with interested non-hams, particularly youngsters—the future of the world's greatest hobby

Try a new mode

Attend a local ARRL Field Day and Winter Field Day

Suggest ways to improve GEARS and attend more meetings.

Get involved in an EMCOMM group

Serve my local community through amateur radio

Try building my own equipment

Upgrade my license class

Learn Morse code or increase my speed

Better organize my shack

Not be afraid to ask questions (trust us, no ham knows it all)

Reach out to other GEARS members to learn more about this hobby

While resolutions are all fine and dandy, turning our lofty intentions into action isn't always easy. A good place to start is with a good reference book, and you'll find no better than the ARRL Operating Manual.



'73s

### GEARS CENTURY MEMBERS

Michael Ellithorp    Kent Hastings  
Bennett Laskey     Jim Van Sickle

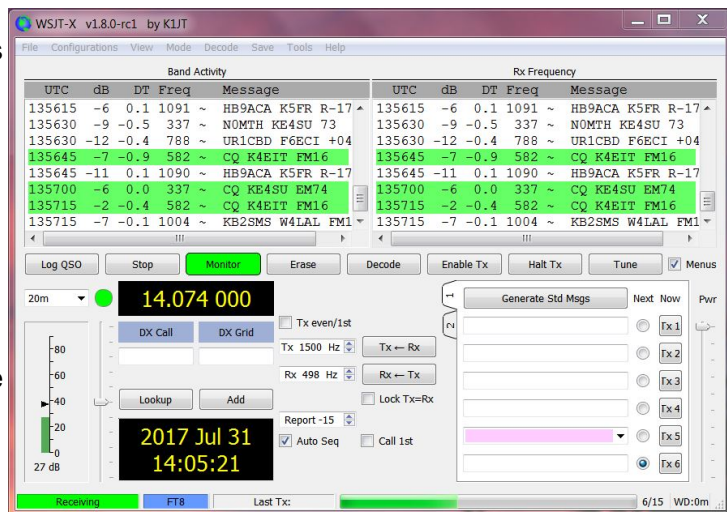
*We thank these members for their extra support.*

## FT8: Low Signal or Low Power?

By Elizabeth Klinc, KE8FMJ

It is always interesting to speak on controversial topics, and FT8 sure has had its fair share of controversy. There is one complaint in particular that keeps reappearing: How much power can be used while transmitting in FT8?

FT8 is, in fact, a weak signal mode, not a low power mode. It is always recommended to use minimum output power to make a QSO. As I have pointed out in the past, as hams we are bound by CFR TITLE 47 Part 97.313: "An amateur station must use the minimum transmitter power necessary to carry out the desired communications."



Communication modes such as FT8, FT4, JT9, JT65, QRA64, ISCAT, and MSK144 are all designed for making reliable and confirmed QSOs under extreme weak-signal conditions. From Gary Hinson, ZL2iFB's FT8 Operating Guide at [physics.princeton.edu](http://physics.princeton.edu):

Although FT8 is a weak signal mode, not a QRP mode per se, please keep your transmit power down. Be nice! Generally on HF, if a path is open, just a few watts will do. Put your amplifier on standby. Turn down the wick to QRP levels. Try it! If you don't get any responses at all, try 10 watts, maybe 20 or 30. If you find that you routinely "need" 100 watts or more, that is a strong hint that your feeder and antenna system are inefficient. Check for corrosion and loose connectors. Try making a simple halfwave dipole as a comparison antenna. You will find that you can receive better if your antenna is in good shape, and reception is kinda useful for DXing.

The perfect transmission is about more than just power. Your radio might hear better or worse than other radios. You may be working with a compromised antenna system. You could have a wide variety of items causing noises that stunt your signal down to practically nothing. Or maybe just the sun isn't very cooperative on the current day, causing the bands to be mostly closed.

Also from the FT8 Operating Guide:

There are situations where QRO, up to your license limit, is both appropriate and necessary, for instance CQing on a closed band, hoping to catch DX as the band opens, or calling someone weak (below, say,

-20 dB). Occasionally, we experience one-way propagation as if there is a giant diode in the ionosphere: DX stations are loud but cannot hear us. Maybe they have high QRM on their end. Maybe there is a tilt in the ionosphere.

Let's take a look at what power is or can be. A more precise term would be ERP (effective radiated power). This is a measure of the flux in the direction of the opening (azimuth and elevation), which is a combination of power delivered to the antenna with its antenna pattern. As an example, the ERP of a 100 watt transmitter through a transmission line with -3 dB loss and an antenna gain of 11 dBi in the ionospherically determined path's azimuth and elevation angles would be a bit over 600 watts.



Remember, more power will get the other station to hear you; however, it doesn't help you receive more or better stations. The antenna and line gain and loss apply to both transmit and receive, though.

One more time for those in the way back—FT8 is a weak signal mode, NOT a low power mode. So when you're on the air, play fair and responsibly.

Questions? Email me at [KE8FMJ@arrl.net](mailto:KE8FMJ@arrl.net).

Elizabeth Klinc, KE8FMJ, is Greene County, Ohio, Emergency Coordinator

## **Coaxial Cable Guide: Understanding the Differences Among Types of Coaxial Cable**

By Mark Haverstock, K8MSH

Though the first coax cable was developed in the 19th century, it didn't become popular with Hams until after World War II when war surplus was plentiful. Hams liked it because it was easy to obtain, relatively inexpensive, and easy to install—run and done.

### **Right Cable, Right Application**

You've probably noticed that most cable is identified with the letters RG plus a number. The RG prefix on cable stands for "Radio Guide," the original military specification for coax cable. The number that follows the RG was just a page in the radio guide—it has no other significance.

The RG designation is just a general description of coaxial cables that are available. Every manufacturer has their own variations, including differences in shielding material, insulation, outer jackets, and other traits. Transmission loss, power handling, and other specs will vary a bit from one brand to another. An RG-8U cable from one manufacturer may be slightly different from that made by another.

### **Comparing Cables**

When reading the coaxial cable spec charts, most focus on attenuation (loss) figures, which are generally expressed in dB per 100 feet at a given frequency. Though this may be one deciding factor in choosing your cable, splitting hairs over a few tenths of a dB may not make much difference in real-world applications.

Cable jackets are the first line of defense for coax cable. They provide moisture, chemical, UV, and ozone protection. UV-resistant cable is preferable for outdoor use, which will help extend the life of your coax. If you're running cable underground, be sure to choose one that is rated for direct burial.

Size matters. Smaller diameter cables are OK for short runs, portable/mobile use, or for low frequency antennas. At VHF/UHF frequencies, and for long cable runs, larger diameter cables will always be a better choice.

Power levels are also an important consideration, especially if you run an amplifier or continuous modes, such as AM or digital. It's a good idea to use heavier-duty coax in these applications.

Generally, the lower the frequency, the more power a cable will handle. For example, DX Engineering Low-Loss 50-ohm 400MAX cable will handle 6.9 kW at 5 MHz, 4.8 kW at 10 MHz, and 2.8 kW at 30 MHz.

## What Do You Really Need?

Consider the following before you buy: operating frequencies, power level, length of cable run, and whether the cable will be installed inside, outside, or buried in the ground. Also think about if the cable will be subjected to frequent bending, such as a cable that connects to an antenna with a rotator.

The following are suggestions for using some of the most popular varieties of coaxial cable and their equivalents.

**RG-58A/U:** This flexible cable is about .195 inches OD with a single braided shield. It's typically used for lower power applications, short patch cords, and mobile installations. The small diameter allows it to fit into tight spaces typically found in vehicles. Because of the relatively short cable distances involved in mobile installations, losses are minimal.

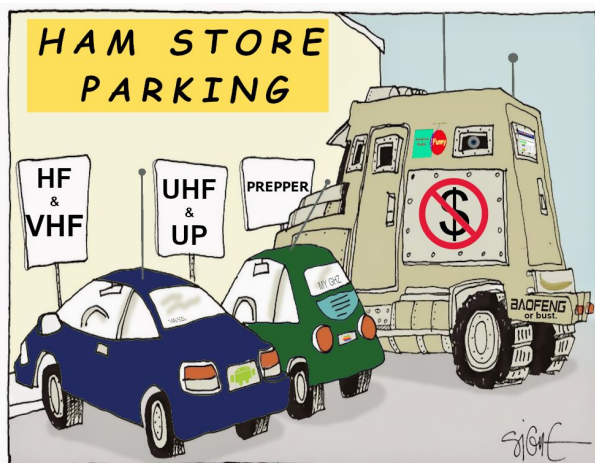
**RG-8X:** This .242 inch OD cable is extremely popular in the Ham radio community primarily because it's super flexible, relatively low loss, and fairly inexpensive. It's good for HF applications up to 30 MHz at 1.2 kW and is generally suitable for runs up to 100 feet. It's also acceptable for short runs on 144/220/440 MHz, especially in mobile applications.

**LMR 240:** This .240 inch OD cable is an improvement over 8X, adding foil shielding to obtain lower loss figures. The Ultraflex version is easier to work with and suitable for use with antenna and rotator combinations.

**RG-213/RG-8U:** These .405 inch OD cables are best for high power use and providing low loss, especially for runs of more than 100 feet for HF use. The RG-8U foam dielectric has a slight edge over the solid dielectric RG-213 when it comes to losses.

**400MAX /LMR400:** Though this cable is generally the most expensive of those listed, it provides some of the lowest attenuation figures. The Ultraflex version is still pliable enough to use with antenna/rotator combos if you provide a generous bend radius. This is the preferred cable for VHF/UHF use and works very well with HF at 3 kW up to 30 MHz. The larger diameter LMR600 is sometimes used as an inexpensive substitute for hard line.

Don't get caught short. Apply the old carpenter's saying when buying coaxial cable—measure twice, order once. For instance, if you need to run cable from your radio to the antenna, make sure to measure the actual length you need, including bends and turns. You can easily underestimate if you just measure the straight line distance. It doesn't hurt to order a little extra, since it's easier to trim a cable than splice one. I typically order an extra 10%, with any leftovers going to making patch cables or doing mobile installations.



## GEARS Officers:

President.....Kent Hastings, WA6ZFY  
Vice-President.....Jamie Johnson KN6PWW  
Treasurer.....Jim Matthews, K6EST  
Secretary.....Tony Stefanetti KN6UNT  
Director.....Bennett Laskey, K6CEL  
Director.....Larry Mitchell KF6NCX  
Director.....Rich Astley, N3UOR  
Past President.....Jim Matthews, K6EST  
VEC Chairman.....Tom Rider, W6JS

GEARS Newsletter archive is here:

<https://drive.google.com/GEARS>

Follow GEARS on Facebook [www.facebook.com](http://www.facebook.com)

GEARS Newsletter edited by Jim Matthews K6EST

[JiminChico@yahoo.com](mailto:JiminChico@yahoo.com)

Your dues and contributions support our local repeaters, ARES, and outreach events to keep amateur radio alive in our area. GEARS also makes donations to support other local repeaters and clubs.

**GEARS Dues and Donations can be made  
online at**

[paypal.me/w6rhc](https://paypal.me/w6rhc)

Or by mail to:

GEARS

PO Box 202

[Chico, CA 95927](#)

Steve McDermott K6AKF is selling some equipment from a local silent key:

Here is a listing of radio gear from a ham friend that passed away in September. Before he passed, he asked me to sell all his of his ham gear. All funds generated of the selling of his gear will be given to his widow.

This will be the first posting of many more to be posted here later. You must be a licensed amateur to purchase these radios.

If you are interested in any of these HT's please call me and let know which HT's you're interested in purchasing. All HT's have been re-set to the factory defaults and have a desk charger, power supply, antenna & manual. Home phone number is 530-894-4080. No calls after 9pm.

All sales must be cash only, you must have the exact dollar amount, no change available. No checks or credit cards.

Any Tone

At-3318UV \$30.00

Baofeng

UV-5R \$20.00

UV-5R \$20.00

BTECH

UV-5X3 \$30.00

Wouxun

KG-UV899 \$40.00

KG-UVD1P \$40.00

KG-UV3D \$40.00